

REMARKS

Reconsideration of the present application in view of the following remarks is respectfully requested.

I. Status of the Claims

Claims 1-5 and 11 are currently pending in this application.

Claim 3 has been canceled.

Claim 1 has been amended to incorporate the subject matter of now-canceled claim 3. Thus, no new matter has been added by the amendment to claim 1.

II. Claim Rejections under 35 U.S.C. §103

Rejection of Claim 11

Claim 11 is rejected under 35 U.S.C. § 103 for obviousness over Suzuki et al. (U.S. Patent No. 7,108,820; hereinafter “Suzuki”).

According to the Examiner, Suzuki teaches a method for producing an injection molded article comprising the steps of forming pellets of a coated substance after impregnating a natural fiber in a lactic acid based resin by drawing. According to the Examiner, “drawing” occurs during the kneading and extruding steps. The Examiner acknowledges that Suzuki does not teach the additional step of adding an additional portion of lactic acid-based resin, but contends that this step is merely duplicative of the first step in the claimed method, and thus has no patentable significance.

As explained more fully below, the Applicants respectfully traverse on the basis that Suzuki does not teach or suggest a method for producing injection molded article that uses drawing to impregnate a lactic acid-based resin with a natural fiber, nor does Suzuki teach or suggest an additional step of adding additional lactic acid-based resin to pellets of lactic acid-based resin pellets already impregnated with natural fiber.

As a first matter, the method taught in Suzuki involves mixing polylactic acid with carbon fiber by kneading in a twin-screw extruder, followed by extrusion. The claimed method, on the other hand, involves mixing polylactic acid and kenaf natural fiber by drawing. By impregnating the natural fiber with the lactic acid based resin by drawing, rather than kneading, the feed failure due to the high bulk density of the fiber is alleviated. (See original specification as published (US 2006/0202391), at p. 5, paragraph [0062]). In addition, when a natural fiber/lactic acid resin that has been impregnated by drawing is subsequently kneaded in the twin-screw extruder, the natural fiber is dispersed much more completely and evenly than if the polylactic acid and fiber had been mixed by kneading (as taught in Suzuki). This homogenous dispersion of natural fiber in lactic acid-based resin provides improved physical properties, specifically greater (i) heat resistance and (ii) crystallization rate, than a resin that has not been mixed by drawing, such as the resin taught in Suzuki. (See original specification as published, at p. 5, paragraphs [0049] and [0062]). Regarding the Examiner's contention that drawing is taught in Suzuki, because it occurs during the kneading and extruding steps, one of ordinary skill in the art would understand that drawing does not simply occur during kneading and extrusion – it is an entirely different process altogether, and one that Suzuki does not teach or suggest. Moreover, the Applicants respectfully point out to the Examiner that it is not the occurrence of drawing that is important, but rather what is accomplished during the drawing process. In the claimed method, drawing is used to mix the polylactic acid and kenaf natural fiber, which results in the aforementioned benefits of the claimed invention. Suzuki, on the other hand, does not teach or suggest drawing to mix polylactic acid with carbon fiber, but instead teaches missing by kneading. Thus, one of ordinary skill in the art at the relevant time (i.e., the time of filing of the instant application), would not be able to employ the teachings of Suzuki to arrive at the claimed method. For this reason at least, claim 11 is not obvious over Suzuki.

Moreover, the Examiner asserts that the additional step of adding an additional portion of lactic acid-based resin is merely duplicative of the first step in the claimed method, and thus has no patentable significance. However, if the Examiner takes a closer look at the instant specification as published, she will realize that she is mistaken, and also that it is significant that Suzuki fails to teach or suggest this additional step. The first step of the method of claim 11 is “forming pellets of

a coated substance after impregnating a natural fiber (B) in a lactic acid based resin (A) by drawing.” Then, after these pellets are formed, an additional amount of lactic acid-based resin (A) is added to the pellets. There are at least two differences between this second step and the first step: (i) no natural fiber (B) is added in this second step (as in the first step), and (ii) the mixing in this second step is not by drawing (as in the first step). Thus, this second step is **not** duplicative as the Examiner contends. Nor, in fact, is the reason for performing this second step duplicative of that for performing the first step. As explained above, in the first step, a lactic acid-based resin (A) is impregnated with natural fiber by drawing, leading to less feed failure and providing coated pellets having the benefits described above, namely greater (i) heat resistance and (ii) crystallization rate. The second step, on the other hand, serves to increase the ratio of lactic acid-based resin (A): kenaf fiber (B) to a more preferable ratio (*see* original specification as published, p. 2, paragraph [0026], stating that “resin composition must contain the lactic acid based resin (A) and the natural fiber (B) in a mass ratio of 99:1 to 70:30, and **preferably** 95:5 to 80:20.”), without abolishing the benefits conferred by the drawing procedure in the first step. For example, in Example 1 of the original specification (which appears at p. 6, paragraphs [0074] and [0075]), the ratio of lactic acid-based resin (A): kenaf fiber (B) is increased in the second step to 95:5 from the 70:30 ratio achieved in the first step. Thus, not only is the second step not duplicative of the first step, it also serves a completely different purpose than the first step. And, Suzuki does not teach or suggest an additional step of adding additional lactic acid-based resin to pellets of lactic acid-based resin pellets already impregnated with natural fiber. Thus, for this reason as well, claim 11 is not obvious over Suzuki.

Therefore, for the reasons provided above, claim 11 is not obvious over Suzuki, and this rejection should be withdrawn.

Rejection of Claims 1-5

Claims 1-5 have been rejected as obvious over Suzuki in view of Shiraishi et al. (U.S. Patent No. 6,124,384; hereinafter “Shiraishi”). The Examiner asserts that Suzuki teaches all of the limitations of the claim 1 composition, except for a natural fiber containing the required amounts of cellulose and lignin. According to the Examiner, Shiraishi teaches resin compositions containing

bamboo and bagasse, which are natural embraced by the claims. The Examiner contends that one of skill in the art would be motivated to replace the fibers in the Suzuki composition (e.g., carbon or glass fibers) with the Shiraishi fibers in order to make the composition biodegradable. The rejection is respectfully traversed. Regarding claims 2-3, the Examiner acknowledges that Suzuki does not teach the particular physical properties recited in these claims, but contends that because Suzuki and Shiraishi teach all the claimed ingredients, the “claimed effects and physical properties would be implicitly achieved” (See Office Action at p. 3). The Applicants respectfully traverse.

As a first matter, the subject matter of now-canceled claim 3 (i.e., reciting that the “injection molded article has a deflection temperature under load of 133°C or more”) has been added to claim 1. Thus, any injection molded article that falls within the scope of any of claims 1-5 must have a deflection temperature under load of 133°C or more. And, the combined teachings of Suzuki and Shiraishi are completely devoid of a teaching or suggestion of an injection molded article that has a deflection temperature under load of 133°C or more.

The exemplary Suzuki composite articles contain lactic acid resin and either carbon fiber or glass fiber for reinforcement. A comparison of a lactic acid/glass fiber composite with the claimed composites is provided in Table 1 (See original specification as published, Table 1, at the bottom of page at page 7, specifically Comparative Example 2). According to Table 1, lactic acid/glass fiber composite provides a deflection temperature under load of 125 °C, well below the deflection temperature under load of the claimed injection molded article.

Applicants respectfully submit that this enhancement of deflection temperature under load is not taught or suggested by Suzuki and Shiraishi, and in fact is unexpected in view of the teachings of Suzuki and Shiraishi. The Examiner contends that one of skill in the art would be motivated to use natural fibers such as bamboo or bagasse in the Suzuki composites because these fibers are biodegradable. Nonetheless, there is nothing in either of these references that teaches or suggests that such injection molded articles would display the advantageous physical properties they surprisingly turn out to have. Accordingly, the Examiner’s alleged *prima facie* case is hereby rebutted.

With respect to the Examiner's comment that using the claimed fibers in the Suzuki composite would produce materials having the physical characteristics embodied in claims 2-3 (Applicants note again that claim 3 has been canceled and its subject folded into claim 1), the applicants respectfully remind the Examiner that she has not proffered a rejection for inherent anticipation. Neither Suzuki nor Shiraishi teach each and every limitation of the claims and, thus, the Examiner cannot use inherency as a basis for her rejection without some teaching or suggestion that using the claimed fibers would improve these properties in the Suzuki composite. Such a teaching or suggestion is wholly absent in Suzuki and Shiraishi. At best, the Examiner has used hindsight reconstruction from knowledge gleaned *only* from applicants' disclosure. Such a reconstruction is not a proper basis for establishing a *prima facie* case of obviousness. (See MPEP 2145, citing *In re McLaughlin* 443 F.2d 1392, 1395).

Thus, claims 1 and 2 are not obvious over Suzuki in view of Shiraishi.

Regarding claims 4 and 5, they stand rejected for the same reasons as does claim 1. As demonstrated by the arguments set forth above, claim 1 is not obvious over Suzuki in view of Shiraishi. Therefore, claims 4 and 5 are not obvious over Suzuki in view of Shiraishi for the same reasons. In addition, claims 2, 4 and 5 ultimately depend from claim 1. A dependent claim includes all the limitations of the claim from which it depends (and further limits the claim). Thus, because claim 1 as amended is not obvious over Suzuki in view of Shiraishi, claims 2, 4 and 5 cannot be obvious, either.

In view of the above remarks, applicants submit that the Examiner's rejection of claim 1-5 has been addressed and overcome. Withdrawal of the present rejection is respectfully requested.

III. Conclusion

In view of the above remarks, it is respectfully requested that the application be reconsidered and that all pending claims be allowed and the case passed to issue.

If there are any other issues remaining, which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number indicated below.

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Respectfully submitted,

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